

## PATENT ABSTRACTS OF JAPAN

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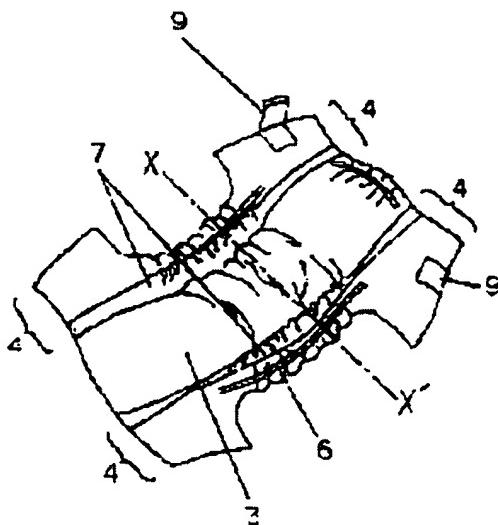
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## (54) DISPOSABLE DIAPER

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a disposable diaper capable of effectively preventing the leakage of urine and soft stool from the crotch, and ensuring freedom from a feeling of physical disorder such as tightening a user's thigh root and giving a pain.

**SOLUTION:** Regarding a disposable diaper formed out of a liquid permeable surface sheet 1, a liquid impermeable lining sheet 2, an absorptive body 3 laid between both sheets 1 and 2, side flaps 4 externally extended from both lengthwise ends of the absorptive body 3, and the second side flaps 7 branched from the side flaps 4 and erected vertically, and fitted with stretch and elastic members 6 on the side flaps 4 and the second side flaps 7 along a lengthwise direction, the tensile stress of the second side flaps 7 of the diaper is within the range of 30 to 180mN, and the water resistance pressure of a sheet forming the second side flaps 7 is equal to 80mmH<sub>2</sub>O or more.



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**CLAIMS**

[Claim(s)]

[Claim 1] The surface sheet of liquid permeability, the rear-face sheet of liquid impermeability, and the absorber arranged among both [these] sheets. It has the side flap which extended outside from the longitudinal direction edges on both sides of an absorber, and the 2nd side flap which branches from a side flap and stands up. In the disposable diaper with which the flexible elastic member is arranged along with the longitudinal direction at the side flap and the 2nd side flap. The disposable diaper characterized by for the tensile stress of the 2nd side flap by which said flexible elastic member has been arranged being the range of 30-180mN, and the water pressure-proof of the sheet which forms the 2nd side flap being more than 80mmH<sub>2</sub>O

[Translation done.]

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## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention has effectiveness in preventing the urine leakage of \*\*\*\* Rika and others, loose passage leakage, etc. about a disposable diaper, and it relates to the disposable diaper which does not give displeasure, such as a pain, in order not to bind a wearer's thigh root tight.

[0002]

[Description of the Prior Art] The disposable diaper has composition which has arranged the absorber which consists of the hydrophilic sheet, curdy pulp, and super-absorbent polymer matter between the surface sheet of liquid permeability, and the rear-face sheet of liquid impermeability. Since it comes to use the super-absorbent polymer matter into the absorber of a disposable diaper in recent years, greatest effectiveness will be raised to a urinary leak and reversion. However, the super-absorbent polymer matter may leak temporarily, when a lot of urine and loose passages are discharged, since urinary rate of absorption is extremely slow compared with curdy pulp. Then, the cure for neither urine nor a loose passage to leak, such even case has been needed.

[0003] In order to solve these points, arranging a flap on the outside of an absorber has been proposed. For example, it has the flap of the duplex containing a flexible elastic member like a publication in JP,6-93901,B on the outside of an absorber, and an inside flap is moved to an absorber position, and is arranged, a pocket is formed between the surface sheets on an absorber, and the disposable diaper which measured leakage prevention is known. However, only by having arranged the flap, when the tensile stress of a flexible elastic member is not suitable, desired effectiveness cannot be acquired. When the tensile stress of a flexible elastic member is too weak, a flap does not start at the time of wearing. Or even when it starts, a clearance is made between a wearer's thigh roots, as a result, a flap will not be able to play the role of an anti-leak barrier, but urine and a loose passage will leak and come out of it. Moreover, when too strong, a wearer's thigh root was bound tight strongly, and was bound tight and there was a trouble of marks having remained or giving displeasure, such as a pain, further.

[0004] Moreover, in JP,4-218159,A, by having the 1st and 2nd flaps by which the flexible elastic member has been arranged on both sides of an absorber, and making tensile stress of the 2nd flap weaker than the tensile stress of the 1st flap, even if the body moves, the thigh root is made to carry out stable sticking by pressure of the free edge of the 2nd flap, and preventing the leakage of excrement is proposed. However, the tensile stress of the 2nd flap tends to become weak also in this case, and the 2nd flap does not stand up, but a clearance is made to a wearer's thigh root, the role of an anti-leak barrier can be played and \*\*\*\*\* is not made.

[0005]

[Means for Solving the Problem] The surface sheet of liquid permeability [ this invention ], the rear-face sheet of liquid impermeability, and the absorber arranged among both [ these ] sheets, It has the side flap which extended outside from the longitudinal direction edges on both sides of an absorber, and the 2nd side flap which branches from a side flap and stands up up. In the disposable diaper with which the flexible elastic member is arranged along with the longitudinal direction at the side flap and the 2nd side flap The tensile stress of the 2nd side flap by which said flexible elastic member has been arranged is the range of 30-180mN, and it consists in the disposable diaper characterized by the water pressure-proof of the sheet which forms said 2nd side flap being more than 80mmH(s)2O.

[0006]

[Embodiment of the Invention] Hereafter, this invention is not limited by these although a drawing explains the disposable diaper of this invention.

[0007] Drawing 1 is the perspective view showing the condition of having developed the disposable diaper of this invention. In drawing 1, a disposable diaper has the side flap 4 which extends outside from the edges on both sides of an absorber 3, and the 2nd side flap 7 which stands up up is further formed along with the edges on both sides of an absorber 3, moreover, in the length-from-the-crotch-to-the-cuff field of the side flap 4, the side flap section flexible elastic member 6 arranges -- having -- \*\*\* -- later self -- time -- a side -- the zipper tape 9 for firm attachment of the side flap 4 is attached in edges on both sides. Drawing 2 shows drawing which cut the disposable diaper of drawing 1 by the X-X' line. In drawing 2, the absorber 3 is arranged between the surface sheet 1 of liquid permeability [ diaper / disposable ], and the rear-face sheet 2 of liquid impermeability, as for the surface sheet by which the laminating was carried out. the side flap 4 is formed of the sideseat 5 of another object on the rear-face sheet 2 which extended from the edges on both sides of an absorber 3, and the rear-face sheet 2, and the side flap section flexible elastic member 6 is arranged between the rear-face sheet 2 and the sideseat 5. Moreover, the part located on the absorber 3 of a sideseat 5 is bent so that the side edge may wrap in the flexible elastic member 8, and the 2nd side flap 7 which stands up up is formed.

[0008] The nonwoven fabric of liquid permeability with which the surface sheet 1 consists of polyester, polypropylene, etc., textile fabrics, porous plastic film, porous form, etc. are used. Moreover, natural fibers (for example, woody fiber, curdy fiber, etc.) are sufficient, and it can manufacture from the ingredient of large range, such as combination of a synthetic fiber and a natural fiber. Anyway, since a surface sheet is a part which touches the direct skin, it is soft and its touch should be just good.

[0009] The rear-face sheet 2 consists of the material which sticks a nonwoven fabric and textile fabrics on films of liquid impermeability, such as polyethylene, and the film of liquid impermeability and a nonwoven fabric with leakproofness, textile fabrics, etc., there is especially no limit and the moisture of an absorber should not just ooze out on the outside of a diaper. Moreover, when using a film, though it is liquid impermeability, it is more desirable from using the well-known breathable film which makes only a steam penetrate, and

preventing \*\*\*\*.

[0010] Although it is inserted between the surface sheet 1 and the rear-face sheet 2 and mainly consists of curdy pulp and super-absorbent polymer matter, an absorber 3 is not restricted especially, and absorptivity sponge and an absorptivity sheet are sufficient as it, and it should just have water absorption power. The curdy pulp in this invention makes the sheet of chemical pulp, mechanical pulp, chemical machinery pulp, or recycled pulp the shape of cotton with a crusher. As a pulp raw material, not only a needle-leaf tree but a broad-leaved tree, straw, a bamboo, a bagasse, etc. are applied. Moreover, a synthetic fiber, a heat welding component, adhesives, etc. may be contained with curdy pulp.

[0011] As super-absorbent polymer matter, although a starch polymer, an acrylic-acid system polymer, a cellulose system, etc. can use what absorbs water the water of 50 times or more of a self-weight, the thing of polyacrylic acid systems, such as sodium polyacrylate, is the most suitable for them from the point of absorptivity ability. Moreover, in the shape of fibrous, a grain, and a sheet etc., especially a limit does not have a configuration, either. As an absorber, the super-absorbent polymer matter and curdy pulp may be mixed, and the laminating of curdy pulp and the super-absorbent polymer matter may be carried out to the shape of a layer.

[0012] The surface sheet 1 and the rear-face sheet 2 may stick the side flap 4, it may be put together, may be constituted, and it may stick the surface sheet 1 with the sideseat 5 of another object, may be put together, and may be constituted. In this case, as for the surface sheet 1 installed on an absorber 3, it is desirable that it is a hydrophilic property so that urine may penetrate promptly, and as for a sideseat 5, it is desirable [the sheet] that it is water repellence as the blot broth of the urine from an absorber is prevented.

[0013] Moreover, although it may be arranged along with the longitudinal direction of a diaper at a straight line, draws a curve and may be arranged according to \*\*\*\*\*\*, since a pocket is formed between the 2nd side flaps 7 and the side flap section flexible elastic member 6 arranged in the side flap 4 can prevent leakage when the side flap section flexible elastic member 6 curves. It is more desirable. Furthermore, it is desirable also from the point of fit nature.

[0014] The 2nd side flap section flexible elastic member 8 is arranged at the 2nd side flap 7 which branches from the side flap 4 and stands up up, and the tensile stress of the 2nd side flap 7 is the range of 60mN-110mN more preferably 30 to 180 mN. When tensile stress is less than 30 mNs, the 2nd side flap 7 stops being able to fit a crotch easily according to a motion of a wearer, a clearance will be made, or the 2nd flap will especially be crushed by facilities etc., and urine and facilities will begin to leak. Conversely, if tensile stress becomes large exceeding 180mN(s), although the effectiveness as an anti-leak barrier becomes high, in order to bind a wearer's thigh root tight too much strongly, it gives a wearer displeasure and is not desirable.

[0015] moreover, the 2nd side flap 7 -- water pressure-proof -- the material more than 80mmH(s)2O -- as long as it is a material more than 160mmH(s)2O more preferably, it may be formed by the sideseat 5 and may be formed for another material. Or another material is compounded, and it is what adjusted water pressure-proof more than 80mmH(s)2O, and may be formed in the both ends of the surface sheet 1 of liquid permeability. When the water pressure-proof of the 2nd side flap 7 is under 80mmH(s)2O, urine and a loose passage become easy to penetrate the 2nd side flap 7, and it becomes impossible to play the role of an anti-leak barrier substantially. Moreover, although you may be liquid impermeability, the material which there is permeability in that case and can prevent \*\*\*\* is good.

Specifically, the nonwoven fabric which consisted of super-thin fiber is suitable. For example, at the same time it fuses thermoplastics and extrudes from the nozzle hole of an extrusion spinning machine \*\*-ize melting resin, form super-thin fiber, and the fiber group obtained on an uptake base material Uptake, In case the nonwoven fabric (it is called MB nonwoven fabric below) manufactured by the MERUTOBU loan method which is accumulated and is used as a nonwoven fabric, and the continuous glass fiber nonwoven fabric which consists of continuation continuous glass fiber are obtained Lead the continuation continuous glass fiber which carried out melt spinning of the thermoplastics with a high-speed flow pulling device, and it is made to \*\*-ization-extend from a spinneret. The sheet formed from two or more nonwoven fabrics, such as a nonwoven fabric (it is called SB nonwoven fabric below) manufactured by the span bond method to which this is made to deposit on an endless wire gauze conveyor, and carries out thermocompression bonding, is also applicable.

specifically, the stream confounding of the compound sheet, MB nonwoven fabric, and SB nonwoven fabric of a three-tiered structure which put MB nonwoven fabric with SB nonwoven fabric was carried out -- it is -- it is -- the laminating was carried out simply -- it is -- it is -- the sheet which carried out after [a laminating] water jet processing is mentioned.

[0016] Furthermore, the 2nd side flap 7 pushes down inside the branch point with the side flap 4, you may fix to a diaper front face, and it may push down outside, and may be fixed to a diaper front face. Or it turns up, once pushing down outside, it pushes down inside, or after pushing down inside, it may turn up, and it may push down outside, and you may fix to a diaper front face.

[0017] As a flexible elastic member, it is used according to the location where the thing of the shape of the shape of yarn, such as natural rubber, synthetic rubber, and urethane, and a string and a flat tip configuration is arranged.

[0018]

[Example] Hereafter, an example explains the disposable diaper of this invention to a detail further. In addition, in each example and the example of a comparison, tensile stress and water pressure-proof are the followings, and were made and measured.

[0019] In the condition of not applying tension for the 2nd side flap which have arrange the measuring method (1) tensile stress flexible elastic member, the sample be cut off in die length of 150mm or more, by part for span 80mm and \*\*\* speed 200mm/, and full-scale 1N conditions, the tension tester (made in Oriental Energy Machine factory, straw graph V1-B) pulled the piece of a sample, and the stress in the condition that gathers had be extended be measured.

(2) the sheet which forms the 2nd side flap of water pressure-proof -- using -- JIS 5.1.1.A of L1092 -- according to law, it measured with the hydraulic tester-proof (made in the Sakawa factory).

[0020]

[Example 1] Two 560-denier yarn rubber has been elongated and arranged to 260%, using the own-making compound sheet of SB nonwoven fabric of amount of eyes 25 g/m<sup>2</sup>, and water pressure-proof 200mmH<sub>2</sub>O, and MB nonwoven fabric as a sheet which forms the 2nd side flap section, tensile stress formed the 2nd side flap of 75mN(s), and the disposable diaper shown in drawing 1 was produced.

[0021]

[Example 2] One 560-denier yarn rubber has been elongated and arranged to 350%, using the own-making compound sheet of SB nonwoven fabric of amount of eyes 25 g/m<sup>2</sup>, and water pressure-proof 200mmH<sub>2</sub>O, and MB nonwoven fabric as a sheet which forms the 2nd side flap section, tensile stress formed the 2nd side flap of 35mN(s), and the disposable diaper shown in drawing 1 was produced.

[0022]

[Example 3] Two 560-denier yarn rubber has been elongated and arranged to 260%, using the own-making SB nonwoven fabric of amount of eyes 25 g/m<sup>2</sup>, and water pressure-proof 80mmH<sub>2</sub>O as a sheet which forms the 2nd side flap section, tensile stress formed the 2nd side

flap of 75mN(s), and the disposable diaper shown in drawing 1 was produced.

[0023]

[Example 4] Two 840-denier yarn rubber has been elongated and arranged to 400%, using the own-making compound sheet of SB nonwoven fabric of amount of eyes 25 g/m<sup>2</sup>, and water pressure-proof 200mmH<sub>2</sub>O, and MB nonwoven fabric as a sheet which forms the 2nd side flap section, tensile stress formed the 2nd side flap of 180mN(s), and the disposable diaper shown in drawing 1 was produced.

[0024]

[The example 1 of a comparison] One 560-denier yarn rubber has been elongated and arranged to 200%, using the own-making SB nonwoven fabric of amount of eyes 12 g/m<sup>2</sup>, and water pressure-proof 40mmH<sub>2</sub>O as a sheet which forms the 2nd side flap section, tensile stress formed the 2nd side flap of 25mN(s), and the disposable diaper shown in drawing 1 was produced.

[0025]

[The example 2 of a comparison] One 560-denier yarn rubber has been elongated and arranged to 200%, using the own-making compound sheet of SB nonwoven fabric of amount of eyes 25 g/m<sup>2</sup>, and water pressure-proof 200mmH<sub>2</sub>O, and MB nonwoven fabric as a sheet which forms the 2nd side flap section, tensile stress formed the 2nd side flap of 25mN(s), and the disposable diaper shown in drawing 1 was produced.

[The example 3 of a comparison] Two 560-denier yarn rubber has been elongated and arranged to 260%, using the own-making SB nonwoven fabric of amount of eyes 12 g/m<sup>2</sup>, and water pressure-proof 40mmH<sub>2</sub>O as a sheet which forms the 2nd side flap section, tensile stress formed the 2nd side flap of 25mN(s), and the disposable diaper shown in drawing 1 was produced.

[The example 4 of a comparison] Three 700-denier yarn rubber has been elongated and arranged to 400%, using the compound sheet of SB nonwoven fabric of amount of eyes 25 g/m<sup>2</sup>, and water pressure-proof 200mmH<sub>2</sub>O, and MB nonwoven fabric as a sheet which forms the 2nd side flap section, tensile stress formed the 2nd side flap of 25mN(s), and the disposable diaper shown in drawing 1 was produced.

[0026] In each example and the example of a comparison, the urine leakage test, the loose passage leakage test, and the draw-down trial were performed using the produced disposable diaper. The examining method is as follows. Moreover, the baby doll shown in drawing 3 was used for the trial. In drawing 3, the stoma connected with the venter pipe 10 and the backside pipe 11 at the venter and backside of a crotch of a baby doll, respectively is arranged. The venter pipe 10 is for pouring in artificial urine, when performing a urine leakage test, and the backside pipe 11 is for pouring in an artificial loose passage, when performing a loose passage leakage test.

[0027] After disposing of the diaper of a sample to the examining method (1) urine leakage-test baby doll and opening and closing a foot 50 times, 50ml artificial urine is poured in with the speed of 7 ml/sec, and is left for 30 minutes. The same activity is repeated until artificial urine leaks from the length from the crotch to the cuff of a doll, and the absorbed amount to leakage is measured. If the absorbed amount to leakage is 300ml or more, it is satisfactory practically.

Artificial urine presentation (% weight % is shown)

Urea 1.9%NaCl 0.8%CaCl<sub>2</sub> 0.1%MgSO<sub>4</sub> 0.1% pure water After disposing of the diaper of a sample to (2) loose-passage leakage-test baby doll 97.1% and opening and closing a foot 50 times, a 80ml artificial loose passage (3000cps) is poured in with the speed of 5 ml/sec. The same activity was repeated until the artificial loose passage leaked from the length from the crotch to the cuff of a doll, and the injection rate to leakage was measured. If the injection rate to leakage is 150ml or more, it is satisfactory practically.

Artificial loose passage presentation (weight % is indicated to be %)

Bentonite 11.1% pure water 88.9% (3) It bound tight, and the trial age of the moon disposed of the sample to ten babies 21-month-old [ 15 months to ], and removed and bound the diaper tight after 40 minutes, and viewing estimated the existence of marks.

[0028] The result obtained in examples 1-4 and the examples 1-4 of a comparison is shown in Table 1. As shown in Table 1, it was checked that the disposable diaper of this invention of examples 1-4 demonstrates the effectiveness which was excellent to urine leakage and loose passage leakage as compared with the disposable diaper of the examples 1-4 of a comparison.

[0029]

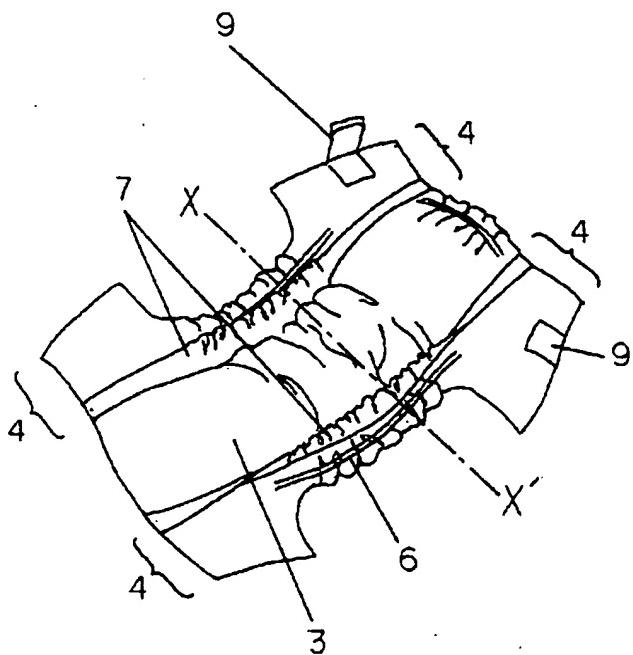
[Table 1]

	引張応力 (mN)	耐水圧 (mmH <sub>2</sub> O)	尿漏れまでの 吸収量 (ml)	軟便漏れまでの 吸収量 (ml)	詰めつけ跡が ついた人數 (人)
実施例1	75	200	410	310	0
実施例2	35	200	330	220	0
実施例3	75	80	375	280	0
実施例4	180	200	430	300	1
比較例1	25	40	220	70	0
比較例2	25	200	260	70	0
比較例3	75	40	250	150	0
比較例4	190	200	420	320	4

[0030]

[Effect of the Invention] As explained above, in order for effectiveness to be to prevent the urine leakage of \*\*\*\* Rika and others, loose passage leakage, etc. and not to bind a wearer's thigh root tight, by this invention, it became possible to offer the disposable diaper which does not give displeasure, such as a pain.

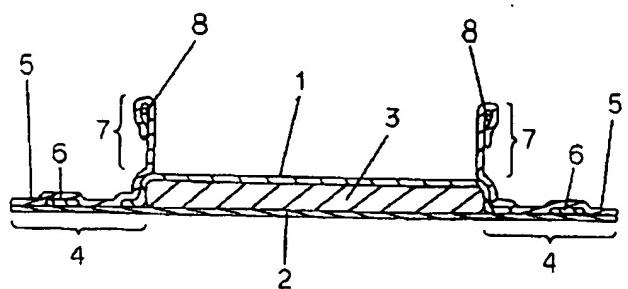
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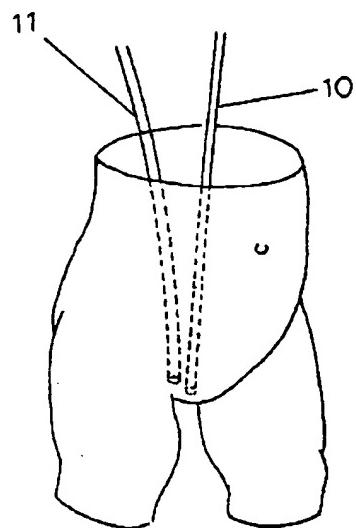
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